

CALFED Bay-Delta Program Fish Assessment Process
Species and Assessment Variable Selection
Description of Assessment Variables
September 13, 1996

The following are brief descriptions of the assessment variables being used in the fish assessment process.

Flow:

Flow is measured in cubic feet per second. In the estuarine and marine fish communities, flow refers to net river or channel flow and does not include tidal flow.

Reservoir drawdown:

Reservoir drawdown refers to the change in reservoir water surface elevation over time and can indicate either falling or rising elevation.

Temperature:

Water temperature is measured in degrees Fahrenheit.

Estuarine salinity:

Estuarine salinity is measured in parts per thousand (is a measure of the concentration of ocean salinity.

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Food availability:

Food availability refers to the density of prey item identified.

Sedimentation:

Sedimentation refers to the movement of sediment, either depositional or erosional processes (including dredging and filling operations).

Diversion:

Diversion includes both the actual water pumped or siphoned from a natural water body and the associated effects of predation, abrasion, turbulence, and fish screens on fish survival.

Barrier:

Barriers include dams, temporary physical barriers of rock and other materials, and gated structures. Barriers are any structures that impede movement of fish or reduce the survival of fish that must pass over, around, or through the barrier. Barriers can indirectly affect fish survival through changes in flow patterns in areas remote from the actual barrier.

Spawning habitat:

Spawning habitat refers only to the physical habitat (e.g., substrate), not relationships to flow, temperature, or other assessment variables that affect habitat quality relative to species needs.

Rearing habitat:

Similar to spawning habitat, rearing habitat refers only to physical habitat and not relationships to other assessment variables that affect habitat quality relative to species needs.

Pollutants:

Refers to pesticides, fertilizers, warm water, salts, metals, and other substances that affect the survival of species in the receiving water body. Pollutants may enter natural water bodies in discharge, runoff, and through direct application (e.g., herbicides).

Fishing:

Includes commercial fishing, sport fishing, and illegal fishing activities that cause or contribute to the death of individuals in a species' population.

Hatchery production:

Includes the human-aided production of a species in facilities isolated to some degree from the natural ecosystem (e.g., fish hatcheries, rearing pens). The production is released to natural water bodies to supplement wild populations or to provide fishing opportunities.

Disease:

Disease refers to fungi, bacteria, viruses, and other pathogens that may limit a species' population abundance. The pathogens may be natural or introduced, and the effects may vary depending on interactions with other assessment variables.

Species interactions:

Species interactions include competition and predation that may limit a species' population abundance. Effects of species interactions may also vary depending on relationships to other assessment variables.

IMPACT ASSESSMENT TOOL

Species/Life Stage:

Assessment Variable:

Fish Community/Geographic Limits (i.e., specific stream, river reach, or area):

Assessment Tool:

Description:

Reference:

Input Data:

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IMPACT ASSESSMENT TOOL

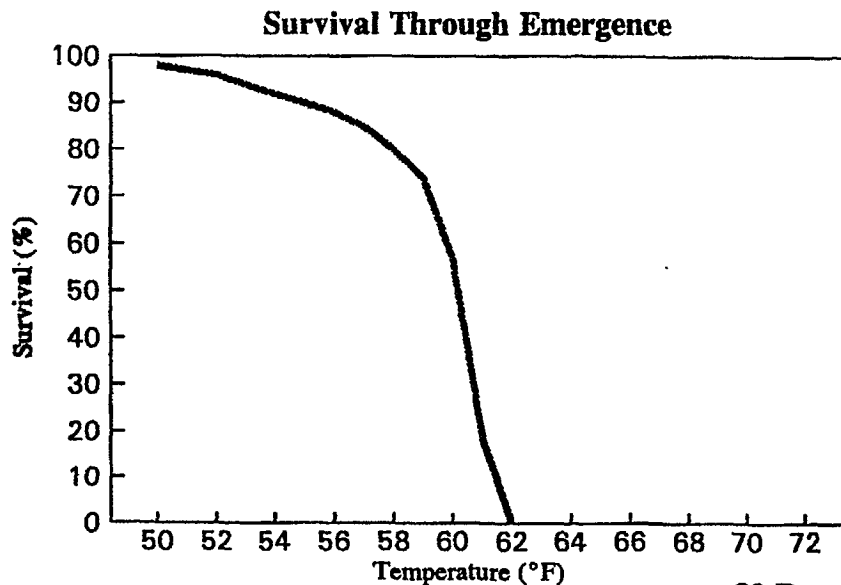
Species/Life Stage: Chinook Salmon (all runs) / Eggs and Larvae

Assessment Variable: Water Temperature

Fish Community/Geographic Limits (i.e., specific stream, river reach, or area): Squawfish-Sucker-Hardhead Community / None

Assessment Tool: Temperature-Egg Survival Relationship for Spawning through Emergence

Description: The relationship shown in the figure below depicts survival through emergence as a function of water temperature. Simulated water temperatures can be used to generate estimated survival of eggs through emergence of fry. Estimated survival can be used to compare differences between CALFED alternatives.



Reference: Brett, J. R., W. C. Clarke, and J. E. Shelbourn. 1982. Experiments on thermal requirements for growth and food conversion efficiency of juvenile salmon *Oncorhynchus tshawytscha*. (Canadian Technical Report of Fisheries and Aquatic Sciences No. 1027.) Department of Fisheries and Ocean, Fisheries Research Branch, Pacific Biological Station. Nanaimo, B.C., Canada.

Input Data: Simulated Water Temperature Data in Degrees Fahrenheit

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